High Plains Herald

The National Weather Service provides weather forecasts and warnings for the protection of life and property and the enhancement of the national economy.

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Inside this Issue:

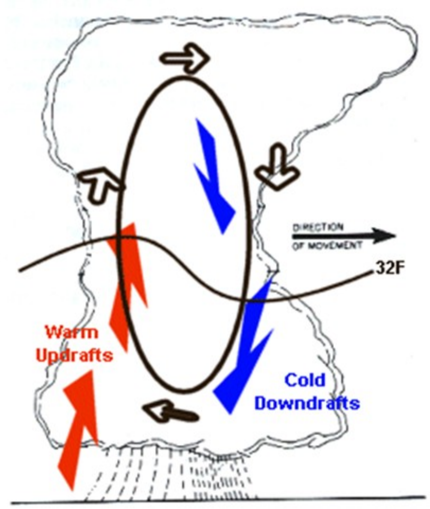
How Does Hail Form?

By John Griffith

What happens when you put water into the freezer? Ice cubes form. Hail develops in a similar fashion. Water drops rise into the mid and higher elevations of a thunderstorm and freeze.

Inside a thunderstorm there are strong updrafts of warm air and downdrafts of cold air. If a water droplet is picked up by the updrafts it can be carried well above the freezing level. There the temperatures are below 32°F and the water droplet freezes. As the frozen droplet begins to fall, carried by cold downdrafts, it may thaw as it moves into warmer air toward the bottom of the thunderstorm.

However, the half-frozen droplet may once again be picked up by another strong updraft carrying it back into very cold air and re-freezing it. With each trip above and below the freezing level the frozen droplet adds another layer of ice.
Finally, the frozen water droplet, with many layers of ice - much like the rings in a tree, falls to the ground as hail!



How big can the hail grow? It depends on the strength of the updrafts. In some supercell thunderstorms, the updrafts can easily exceed 100 mph and the hail can grow to the size of softballs. It is estimated that an updraft speed of 65 mph is needed to produce golf ball size hail.

CoCoRaHS

It is never too late to join a volunteer network of people observing and recording their daily precipitation. It is a fun and interesting way to be a be involved with the weather. If you have questions, please visit www.cocorahs.org for more information or call 307-772-2468 ext. 516.

"A weather model will provide such things as surface and upper air weather patterns, temperatures and precipitation. "

Inside this Issue:

Computer Models

By Mike Weiland

Computer models are a large piece of information and guidance that meteorologists use in creating a forecast. You may have heard the term before, but what is a computer model?

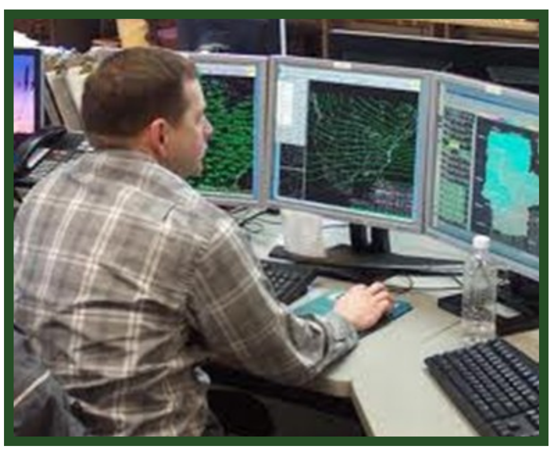
A computer model is a description of the atmosphere out as far as several weeks in advance. There are many atmospheric models, but all models use the equations that govern the atmosphere over various spacing in the vertical and horizontal. The original starting information is surface, upper air and satellite observations of the temperature, moisture, winds and pressure. That information is then placed in horizontal and vertical grids and placed in the mathematical equations that govern the atmosphere. A weather model will provide such things as surface and upper air weather patterns, temperatures and precipitation.

Computer models depend on the fact that mathematical equations can describe the physical changes that govern the weather, just as equations describe movements of the solar system well enough for solar and lunar eclipses to be predicted years, even centuries, in advance. Equations describing the solar system are complicated. Still, mathematicians and astronomers have been able to predict eclipses for centuries. The atmosphere's equations are much more complex. Solving them had to wait not only for more knowledge, but also for faster and larger computers.

When researchers began developing the first computer models for the earth's atmosphere in the 1950s, they worked with computers that were very limited compared with today's. As a result, the first models were overly simplified, but still provided valuable insight into the atmosphere's future state. As computer technology advanced, the complexity of the forecast models increased and more of the dynamical and physical factors influencing the atmosphere were taken into account, which improved weather forecasts.

Over the years, computers have become more powerful and their speed and computing power is needed to solve the many equations for every grid point. Some of the fastest computers in the world are used in weather forecasting. With the increase in computing power, computer weather models have increased resolution to as low as 1 km in the horizontal and in the vertical. Each of those many resulting grid points will have current information ingested and then forecast information provided from the model. Models have become much better over the years and they produce quality and useful information. What models could forecast 2 days out 20 years ago is what is currently forecast 5 to 7 days out in the future. Even with the improvement in weather models and their forecasts, their information is still considered guidance and meteorologists based on model biases and experience modify and adjust the model forecast.

In the United States, the National Weather Service's National Centers for Environmental Predictions (NCEP) runs the computer models. Many new models are currently being developed. Some of the models being developed will help forecast tropical features, such as hurricanes. Other models of the future will help forecast smaller scale features, such as thunderstorms and severe weather outbreaks. Once these models are developed, forecasters will be able to issue better and more timely warnings and advisories.



What Creates a Flash Flood?

By Mike Weiland

Flash Flooding is the leading cause of weather related deaths in the United States each year. A Flash Flood is defined as a rapid rise in water due to heavy rainfall and dam failures. For heavy rainfall, the flooding usually occurs within 6 hours of the rainfall. Each rainfall event and area are different across the country as well as across southeast Wyoming and the western Nebraska panhandle.

In our region, the Laramie Range and streams flowing off that range is the most common area for flash flooding. The events happen from April through September, with the peak periods being late May through early August. Flash flooding typically occur in the afternoon or evening hours.

Flash flooding usually is enhanced by a number of factors. These include;

- Rate of rainfall.
- Type of soil the rain is falling on.
- Steepness of the terrain.
- Urbanization and vegetation type.
- Amount of recent rainfall.

If the rainfall rate is heavy (i.e. an inch or more per hour), the rainfall is more likely to runoff into streams or low lying areas. Then, if the heavy rain is falling on a more clay type soil, or in areas with less vegetation or cities where concrete is widespread, the rain will also runoff more quickly, causing the possibility of flash flooding. If the ground is steep, the rain will also runoff more quickly. This is what happened in the Big Thompson Flood in 1976 in Colorado. Finally, if an area has experienced recent rainfall, the ground may be saturated and cannot hold much more water, allowing for the current rainfall to runoff.

Your National Weather Service monitors all of those elements and when it looks like rainfall will runoff quickly, a Flash Flood Warning will be issued. When the Warning is in effect, be sure to head to higher ground and avoid crossing areas that have water running over roads and bridges.

Aftermath of Cheyenne, WY flash flood
01 August 1985

Medicine Bow Mountains in southern Wyoming on Tuesday, July 19, 2011

The wireless industry, The FCC, and FEMA will roll-out the WEA's (Wireless Emergency Alerts) system nationwide this year.

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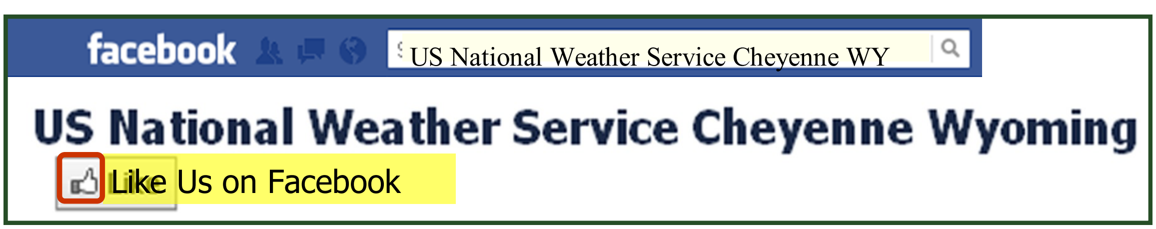
Tornado warnings, flash flood warnings and several other high-end warnings will go direct to wireless users in an affected county automatically if their device is compatible.



"Each rainfall event and area are different ..."

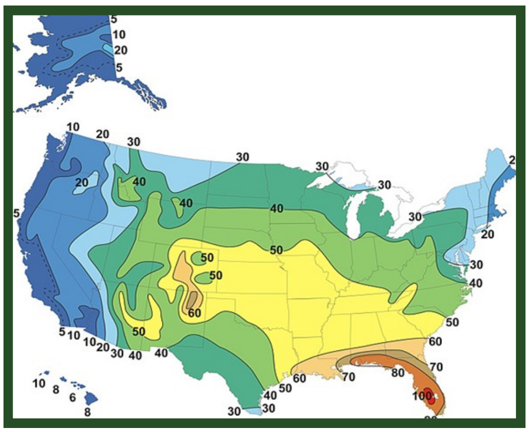
Inside this Issue:

Thunderstorms and Severe Weather

By Mike Jamski

The figure below shows the average number of thunderstorm days per year throughout the U.S. Outside the southeastern states, the Front Range of Colorado and northern New Mexico experience 50 to 70 thunderstorm days annually.

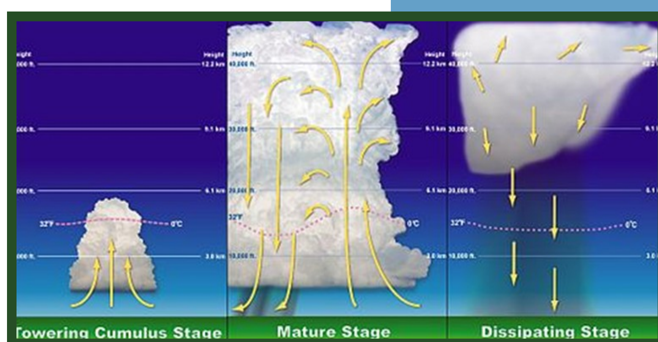
Thunderstorms require three ingredients: **moisture, instability** and **lift**. Sources of



moisture are the Atlantic and Pacific oceans as well as the Gulf of Mexico. Air is considered **unstable** if it continues to rise when given a nudge upward. An unstable air mass is characterized by warm moist air near the surface and cold dry air aloft. In these situations, if a bubble or parcel of air is forced upward it will continue to rise on its own. As this parcel rises it cools and some of the water vapor will condense forming the familiar cumulonimbus cloud. Typically, for a thunderstorm to develop there needs to be a mechanism which initiates the upward motion. Some sources of lift are: differential heating where the land mass warms quicker than the surrounding water surface creating thermals; fronts which separate air masses of different densities and temperatures; dry lines which separate air masses of different moisture content; outflow boundaries from thunderstorms whose rain-cooled, more dense air acts to lift warm, moist air to develop new thunderstorms; and orographic lift or upslope of warm, moist air common in the Rocky Mountain west during the late spring and summer.

There are three stages of a thunderstorm: the developing stage, the mature stage, and the dissipation stage. The lifecycle of a typical thunderstorm is about 30 minutes. During the developing stage, a cumulus cloud begins to grow vertically, perhaps to a height of 20,000 feet. Air within the cloud is dominated by updraft. During the mature stage, the thunderstorm has considerable depth, reaching a height of 40,000 to 60,000 feet. Strong updrafts and downdrafts coexist, often when large hail, damaging winds, and flash flooding may occur. The dissipation stage occurs when the downdraft cuts off the updraft. The storm no longer has a supply of warm moist air to maintain itself and therefore it dissipates. Light rain and weak outflow winds may remain for a while during this stage.

There are three types of thunderstorms: **single cell**, **multi-cell**, and **supercell.** Single cell thunderstorms are short lived (20 to 30 minutes) and while hail and gusty wind can develop, these occurrences are typically not severe. Multicell or organized thunderstorms can have longer lifecycles as they form in environments of significant vertical wind shear, which aids the development of stronger updrafts. They can also evolve into one or more squall lines. Long-lived strong squall lines called derechos (Spanish for 'straight ahead') can travel many hundreds of miles and produce considerable widespread damage from wind and hail. Supercell thunderstorms are long duration, highly organized storms containing updrafts that can exceed speeds of 100 miles per hour, able to produce extremely large hail and strong and/or violent tornadoes, downdrafts that can produce damaging outflow winds in excess of 100 mph - all of which pose a high threat to life and property.



Each year, many people are killed or seriously injured by severe thunderstorms despite advance warnings. While severe thunderstorms are most common in the spring and summer, they can occur any time of the year. There are several hazards associated with thunderstorms: **lightning**, **hail**, **tornadoes**, **flash floods**, and **damaging winds**. Cloud-to-ground lightning poses the greatest threat to life and property since it strikes the ground. Cloud-to-ground lightning is a lightning discharge between a cumulonimbus cloud and the ground. It is initiated by a leader stroke moving down from the cloud. Hail is solid precipitation that is formed when vigorous updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere. Hail can damage aircraft, homes and cars, and can be deadly to livestock and people.

"Thunderstorms require three ingredients: moisture, instability and lift. "

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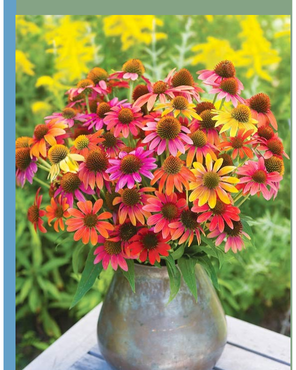


Thunderstorms and Severe Weather - Continued

By Mike Jamski

Hail is most common in the area where Colorado, Nebraska, and Wyoming meet, known as "Hail Alley" and occurs most frequently between the months of May and September during the afternoon and evening. Cheyenne, Wyoming is North America's most hail-prone city with an average of nine to ten hailstorms per year. Tornadoes are violently rotating columns of air descending from thunderstorms in contact with the ground. Although tornadoes are usually brief, lasting only a few minutes, they can sometimes last for more than an hour and travel several miles causing considerable damage. The peak of the tornado season in the U.S. is April through June, but tornadoes can occur anytime. Wind speeds associated with tornadoes range from 70 mph to greater than 200 mph. Most flash floods are caused by slow moving thunderstorms or thunderstorms that move repeatedly over the same area. These floods can develop within minutes or hours depending on the intensity and duration of the rain, the topography, soil conditions and ground cover. Each year, more deaths occur due to flooding than from any other thunderstorm related hazard. Why? The main reason is people underestimate the force and power of water. Many of the deaths occur in automobiles as they are swept downstream. Damaging winds from thunderstorms are much more common than damage from tornadoes. The source of damaging wind from a thunderstorm is the downdraft. A downburst is created by a downdraft that spreads out in all directions and is capable of producing damaging straight-line winds of over 150 mph, often producing damage similar to, but distinguishable from that caused by tornadoes.

Drought conditions return to parts of Wyoming and the Nebraska Panhandle

By Rich Emanuel

Below normal precipitation has occurred across much of the area over the last 6 months. March was particularly dry with some areas seeing their driest March on record. As a result of these dry conditions, drought conditions have returned to parts of the area for the first time since early March of 2011, about 14 months ago.

The main cause for the return of these drought conditions has been an unusually warm and dry winter and spring across much of the region brought about at least in part by a combination of a weakening La Nina and another event known as a positive Arctic Oscillation. These two factors combined to significantly restrict cold air intrusions into the region and reduce the frequency and strength of storm systems that did affect the area.

The following table summarizes total precipitation for select locations across the area from November 2011 through April 2012 and the departure from normal:

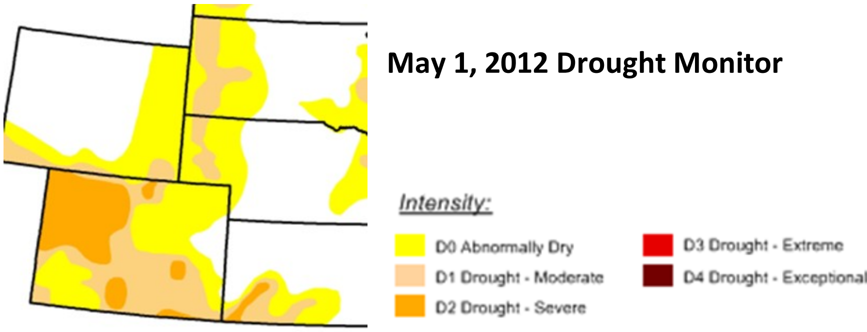
City	November through April total precipitation	Departure from normal (% of normal)
Cheyenne	2.73 inches	-1.98 (58%)
Laramie	2.29 inches	-0.83 (73%)
Rawlins	3.23 inches	-0.26 (93%)
Chadron	3.23 inches	-2.09 (61%)
Scottsbluff	2.55 inches	-2.46 (51%)
Sidney	2.95 inches	-1.83 (62%)

Article continued on Page 6

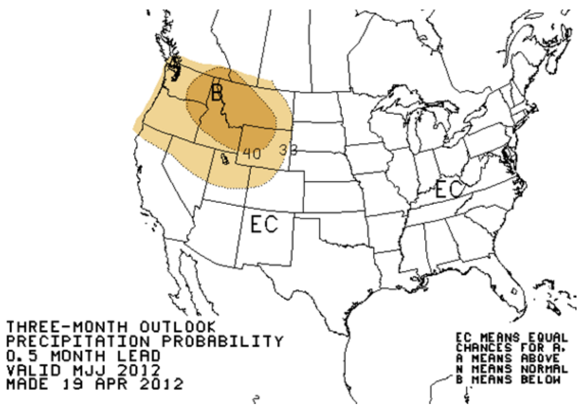
Drought conditions return to parts of Wyoming and the Nebraska Panhandle—continued

By Rich Emanuel

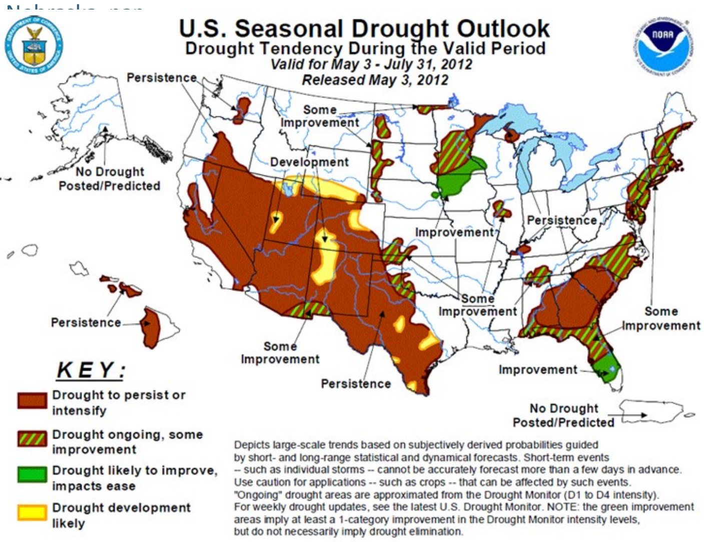
As can be seen from the table, much of the area east of the mountains received slightly more than half the normal precipitation over the last 6 months. The latest National Drought Monitor depicts the return of abnormally dry to moderate drought conditions to much of the area, as can be seen here:



La Nina has now dissipated but some effects still remain in the atmosphere. The latest precipitation outlook for the period May through July shows equal chances for below, near, or above normal rainfall for the Nebraska Panhandle into extreme eastern Wyoming, with slightly better odds for below normal rainfall across the rest of Wyoming, as seen below:



The latest Drought outlook shows some improvement expected in the drought conditions over the Nebraska panhandle but drought conditions persisting or even intensifying over far southern Wyoming, as can be seen on the following graphic:



"...drought conditions have returned to parts of the area for the first time since early March of 2011..."

Inside this Issue:

“Most tornadoes occur in the afternoon and evening hours between 2 and 9 P.M.…“

Inside this Issue:

Tornadoes

By Shawn Liebl

What is a Tornado?

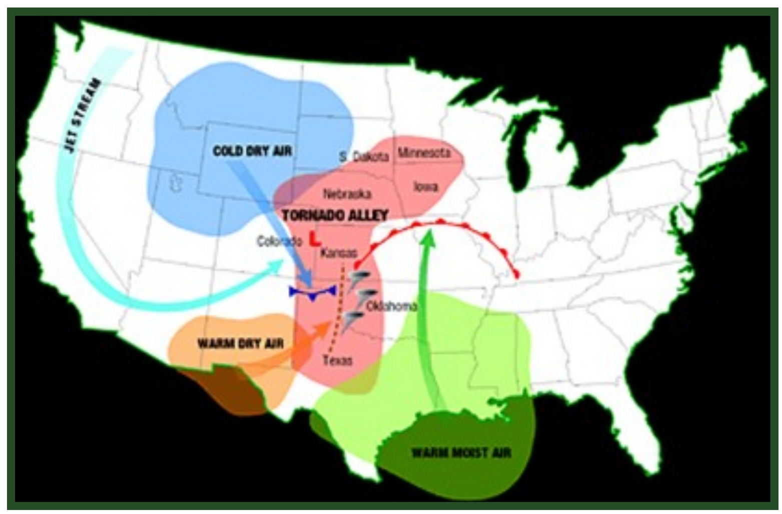
A tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground. Because wind is invisible, you can't always see a tornado. A visible sign of the tornado, a condensation funnel is made up of tiny water droplets. The condensation funnel or funnel cloud may or may not touch the ground during the tornado lifecycle. A funnel cloud itself is not a tornado, but it is a tornado if winds within the rotating column of air reach the ground. If the condensation funnel does not touch the ground, dust or debris is another way to confirm the presence of a tornado. Tornadoes are the most violent of all atmospheric storms have been documented producing wind speeds in excess of 300 mph.

Where do tornadoes occur?

Although tornadoes occur in many parts of the world, these destructive forces of nature are found most frequently in the United States east of the Rocky Mountains during the spring and summer months. Recent trends suggest around 1,300 tornadoes occur nationwide per year, resulting in 80 deaths and over 1,500 injuries. Some of the most deadly tornadoes can have damage paths in excess of one mile wide and 50 miles long. Tornado Alley is a nickname for an area that consistently experiences a high frequency of tornadoes each year. That area includes eastern South Dakota, Nebraska, Kansas, Oklahoma, northern Texas, and eastern Colorado. The relatively flat land in the

Great Plains allows cold dry from Canada to meet warm moist tropical air from the Gulf of Mexico, setting the stage for tornadoes.

Tornado Alley is a nickname for an area that consistently experiences a high frequency of tornadoes each year. That area includes eastern South Dakota, Nebraska, Kansas, Oklahoma, northern Texas, and eastern Colorado. The relatively flat land in the Great Plains allows cold dry from Canada to meet warm moist tropical air from the Gulf of Mexico, setting the stage for tornadoes.



When are tornadoes most likely to occur?

Most tornadoes occur in the afternoon and evening hours between 2 and 9 P.M., with a minimum frequency around sunrise. However, tornadoes can occur at all hours of the day, and nighttime occurrences may give persons sleeping little or no warning of their presence

In the United States, tornadoes occur throughout the year. Because a tornado may occur at any time of the year somewhere in the U.S., there really is no official tornado "season”. Instead, tornadoes are more or less likely depending on where you live and the time of the year. For instance, Gulf Coast States see their highest frequency of tornadoes from February to April. Farther north into central Plains and Tennessee Valley the highest frequency is in May. The northern Plains and Ohio Valley see a peak in June, which is similar to the peak tornado frequency over southeast Wyoming and western Nebraska Panhandle. The fewest tornadoes by season are documented during the winter months, although deadly winter outbreaks can and do occur, mainly in the southeast U.S.

Tornadoes Continued

By Shawn Liebl

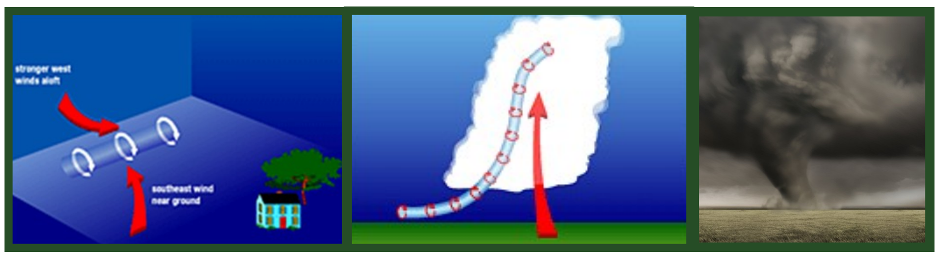
Inside this Issue:

How do tornadoes form?

There are two types of tornadoes, those which form within a supercell thunderstorm, and those that do not.

Non-supercell tornadoes are circulations that can form without a rotating updraft. One type of non-supercell tornado is a landspout. A landspout tornado forms when a thunderstorm updraft encounters vertically rotating air near the ground. The vertically rotating air can be caused by a warm front, cold front, a sea breeze front, or other type of boundary near the surface. When an updraft of a thunderstorm moves over the front or boundary, the vertically rotating air is stretched and tilted by the updraft, eventually turning the vertically rotating air into an upright horizontally rotating column of air. A landspout tornado is born. Waterspouts are similar to landspouts, except they occur over water. Wind speeds within non-supercell tornadoes are usually 100 mph or less, although F2 tornado damage (113-157 mph winds) can occur with stronger landspout tornadoes.

One type of non-tornadic circulation, a gustnado, is many times mistaken for a tornado. A gustnado is a whirl of dust or debris at or near the ground with no condensation funnel. Gustnadoes typically form along the gust front of a thunderstorm, far from the thunderstorm updraft. Some gustnadoes can become large and last for several minutes, making it easy to be mistaken for a tornado..



Supercell spawned tornadoes are the most common, and often the most violent. Supercell tornadoes form as an extension of a mesocylone, which is the rotating updraft of a supercell thunderstorm. The mesocyclone can be present as much as 20 to 60 minutes before a tornado forms. Scientists have learned much about tornado formation from theoretical studies, field projects and physical models, but exactly how these tornadoes form has perplexed researchers for decades. Scientist do not know why one supercell thunderstorms will produce a tornado while a nearby thunderstorms does not, although several theories exist.

One popular theory involves a part of the thunderstorm called the Rear Flank Downdraft (RFD). The RFD is a stream of air which originates in the mid-levels of the thunderstorm about 10,000 to 20,000 feet above the ground. The RFD, for reasons not completely understood moves down the backside of the thunderstorm until reaching the ground in close proximity to the thunderstorm updraft. It is thought interaction between the RFD and updraft is what causes a tornado to develop. Still, not all thunderstorm RFDs produce a tornado. It is thought the composition of the RFD may have a lot to do with tornadogensis. A warm moist RFD may be more conducive to tornadogensis than a cool dry RFD.

Today, research scientists continues to study supercell thunderstorms in hopes of unlocking the secrets of tornado genesis. It is hoped that improved understanding of this process will someday lead meteorologist to better predict when and where tornadoes will form, giving persons within the path of these storms more time to protect themselves.

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Supercell Thunderstorms

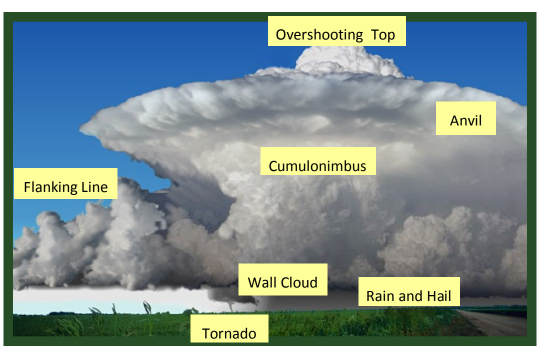
By Rebecca Mazur

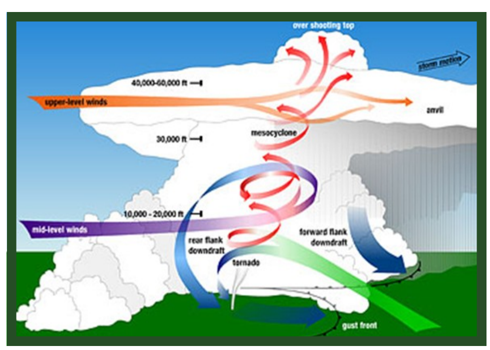
Supercell thunderstorms are one of the stronger types of thunderstorms, and can produce the most damaging and sometimes deadly weather. Very large hail, very strong winds, and tornadoes are typically produced by supercells. Nearly all significant tornadoes and hail ranging from golfball to softball, and sometimes larger size, are produced by supercell thunderstorms.

The defining characteristic of supercells is that they are rotating storms. In general, winds in the atmosphere often change in speed and direction as you go upward in height, which is what meteorologists call wind shear. Sometimes, these winds change very dramatically in speed and direction with height, and the wind shear will then be characterized as strong. The stronger the shear, especially if winds are veering or turning clockwise with height, the more the air has a tendency to spin. If a thunderstorm moves over an area where there is a lot of spin because of the wind shear, the storm will ingest this air through the updraft and may start to rotate as well. This process is what transforms an ordinary thunderstorm into a supercell thunderstorm.

The main core of upward vertical motion in the storm is called the updraft, and this is usually the part of the storm that rotates in supercells. Often, this rotating updraft is called a mesocyclone. In the figure, the lower portion of the updraft is denoted by the green arrow, and the mesocyclone part of the updraft is the area of circulating red arrows in the center of the storm. As the storm matures, it produces a downdraft core which is where the rain and hail occur. Due to the rotation, two distinct downdrafts occur in supercells. The forward flank updraft typically is situated on the front and northern quadrant of the storm, relative to the storm's motion. Much of the heavy rain and hail occurs here. The rear flank downdraft wraps around the backside of the storm, and falls through the backside of the mesocyclone region. Large hail and very strong, damaging winds can occur in the rear-flank downdraft. See the figure for location of the forward and rear flank downdrafts. Beneath the updraft of a supercell, a wall cloud may form which looks like a lowering cloud below the base of the storm, and often times will be rotating with the rest of the storm. The wall cloud is sometimes a precursor to a tornado. If a tornado were to form, it would usually do so within the wall cloud. On the edge of the updraft, striations are often visible in the cloud, and some people say this makes the storm look like it has "stacked plates" or has an appearance of an "upside down wedding cake." If the mesocyclone is separated from the main core of precipitation, it may look like an alien spaceship.

Supercells can occur anywhere, and may last for many hours at a time as long as the thunderstorm continues to move through the main source of energy (or instability) and strong shear. These storms cause great destruction and sometime death due to strong winds, hail, and tornadoes. In addition, frequent deadly lightning often occurs with these storms, and some storms may produce very heavy rain which could lead to flash flooding as well. NWS meteorologists pay close attention to these storms if they form, as they are often a threat to life and property.





Wireless Emergency Alerts

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"The defining characteristic of supercells is that they are rotating storms."

Inside this Issue:

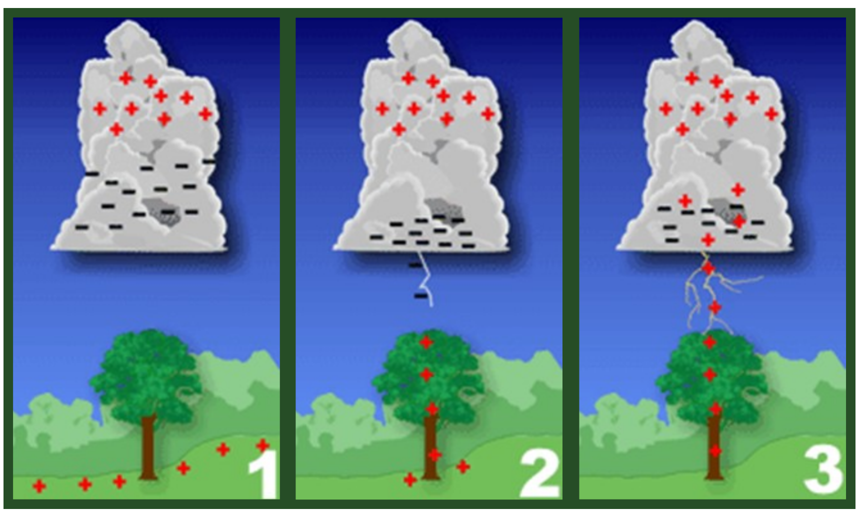
Lightning and Lightning Safety

By Mike Jamski

Summer is the peak season for one of the nation's deadliest weather phenomena--lightning. However, lightning can strike year round. In the United States, on average, 54 people are killed by lightning annually. People struck by lightning can suffer from a variety of long-term, debilitating symptoms. Lightning is one of the oldest observed natural phenomena on earth. At the same time, it also is one of the least understood. The conditions needed to produce lightning have been known for some time. Leading theories focus around the separation of electric charge and generation of an electric field within a thunderstorm. Recent studies also indicate that ice, hail, and semi-frozen water drops are essential to lightning development. Storms that fail to produce large quantities of ice usually fail to produce lightning.

Thunderstorms have very turbulent environments. Strong updrafts and downdrafts occur with regularity and within close proximity to each other. The updrafts transport small liquid water droplets from the lower regions of the storm to heights between 35,000 and 70,000 feet, several miles above the freezing level. Meanwhile, downdrafts transport hail and ice from the frozen upper regions of the storm. When these collide, the water droplets freeze and release heat. This heat in turn keeps the surface of the hail and ice slightly warmer than its surrounding environment, and soft hail, or graupel forms. When this graupel collides with additional water droplets and ice particles, a critical phenomenon occurs: Electrons are sheared off of the ascending particles and collect on the descending particles. Because electrons carry a negative charge, the result is a storm cloud with a negatively charged base and a positively charged top.

A moving thunderstorm gathers another pool of positively charged particles along the ground that travel with the storm (image 1). As the differences in charges continue to increase, positively charged particles rise up taller objects such as trees, houses, and telephone poles.



A channel of negative charge, called a "stepped leader" will descend from the bottom of the storm toward the ground (image 2). It is invisible to the human eye, and shoots to the ground in a series of rapid steps, each occurring in less time than it takes to blink your eye. As the negative leader approaches the ground, positive charge collects in the ground and in objects on the ground. This positive charge "reaches" out to the approaching negative charge with its own channel, called a "streamer" (image 3). When these channels connect, the resulting electrical transfer is what we see as lightning. After the initial lightning stroke, if enough charge is leftover, additional lightning strokes will use the same channel and will give the bolt its flickering appearance.

Positive lightning makes up less than 5% of all strikes. However, despite a significantly lower rate of occurrence, positive lightning is particularly dangerous for several reasons. Since it originates in the upper levels of a thunderstorm, the amount of air it must burn through to reach the ground usually much greater. Therefore, its electric field typically is much stronger than a negative strike. Its flash duration is longer, and its peak charge and potential can be ten times greater than a negative strike. Some positive strikes can occur within the parent thunderstorm and strike the ground beneath the cloud. However, many positive strikes occur near the edge of the cloud or strike more than 10 miles distant, where you may not perceive any risk nor hear any thunder.

"Lightning is one of the oldest observed natural phenomena on earth. "

Inside this Issue:

"... lightning can strike as far as 10 miles from the area where it is raining ..."

Inside this Issue:

Lightning and Lightning Safety - Continued

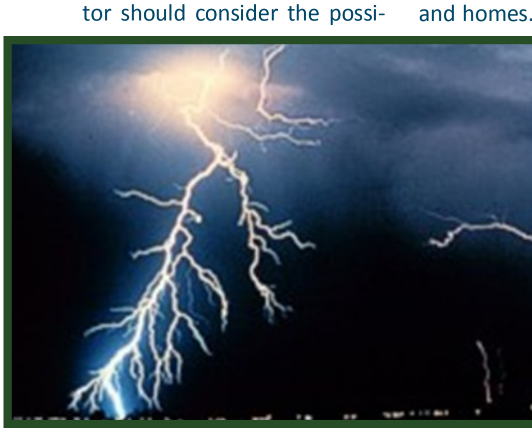
By Mike Jamski

Thunder is a result of the rapid expansion of super-heated air caused by the extremely high temperature (50,000 degrees Fahrenheit) of lightning. As the lightning bolt passes through the air, the air expands faster than the speed of sound generating a sonic boom. Thunder from a nearby lightning strike will have a very sharp crack or loud bang, whereas thunder from a distant strike will have a continuous rumble. The primary reason for this is that the sound shock wave modifies as it passes through the atmosphere. Sound travels roughly 750 mph, or approximately one mile every 5 seconds. The speed actually varies greatly with the temperature, but the rule of 5 seconds per mile is a good approximation.

A lightning safety plan should be an integral part of the planning process for any outdoor event. Do not wait for storm clouds to develop before considering what to do should thunderstorms threaten. An effective plan begins long before any lightning threat is realized. You can't control the weather, so you have to work around it! Detailed weather forecasts are accurate only out to seven days at best, but outdoor events often are planned many months in advance. Because of this limitation, every outdoor event coordinator should consider the possibility of lightning, especially if the event is scheduled during the late spring to early autumn months.

Studies have shown most people struck by lightning are struck not at the height of a thunderstorm, but before and after the storm has passed. This is because lightning can strike as far as 10 miles from the area where it is raining and many people are unaware of how far lightning can strike from its parent thunderstorm. Therefore, if you can hear thunder, you are within striking distance. Seek safe shelter immediately. Remember this lightning safety rule: When thunder roars, go indoors and stay there until 30 minutes after the last clap of thunder. Do not wait for the rain to start before seeking shelter, and do not leave shelter just because the rain has ended. With common sense, you can greatly increase your safety and the safety of those you are with. At the first clap of thunder, go to a large building or fully enclosed vehicle and wait 30 minutes after the last clap of thunder before you to go back outside.

The safest location during a thunderstorm is inside a large enclosed structure with plumbing and electrical wiring. These include shopping centers, schools, office buildings, and homes. If lightning strikes the building, the plumbing and wiring will conduct the electricity more efficiently than a human body. If no buildings are available, enclosed metal vehicles such as automobiles, vans, or school buses are safe alternatives. Once inside a sturdy building, stay away from electrical appliances and plumbing fixtures. If you are inside a vehicle, roll the windows up, and avoid contact with any conducting paths leading to the outside of the vehicle. If outdoors far from a safe vehicle or building, avoid open fields, the top of a hill or a ridge top. Stay away from tall, isolated trees or other tall objects. If you are in a forest, stay near a lower stand of trees. If you are camping in an open area, set up camp in a valley, ravine or other low area. Remember, a tent offers NO protection from lighting. Stay away from water, wet items (such as ropes) and metal objects (such as fences and poles). Water and metal are excellent conductors of electricity. If you are caught in a thunderstorm on a small boat, drop anchor and get as low as possible. Large boats with cabins, especially those with lightning protection systems properly installed, or metal marine vessels are relatively safe. Remember to stay inside the cabin and away from any metal surfaces.



Lightning Safety Week is June 24-30, 2012

Remember: When Thunder Roars, Go Indoors!